

THE OSTEOLOGICAL CHARACTERISTICS OF THE FAMILY HEMITRIPTERIDÆ.

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(With plate XXXI.)

Much difference of opinion has prevailed respecting the relationship of the genus *Hemitripterus* and its taxonomic rank. By the older authors it was approximated to the cottiform genera. In the "Catalogue of the Fishes of the Eastern Coast of North America" (1861, p. 42), it was referred to the family "*Cottoidæ*" as distinguished from the "*Scorpenoidæ*." Dr. Günther subsequently removed it to the family *Scorpenoidæ*. Influenced by Dr. Günther's views, I also subsequently (1865) transferred the genus to the family *Scorpenidæ*, isolating it, however, as a subfamily type. Later (in 1872 and 1876), I elevated it to family rank and approximated it to the *Cottidæ*. By most American ichthyologists, the genus has been referred to the family *Cottidæ*. A reëxamination of the genus was undertaken to ascertain what more detailed study would indicate. The results may be formulated in three dicta:

(1) The genus *Hemitripterus* is unquestionably very closely related to the *Cottidæ*.

(2) The genus and the *Cottidæ* agree in so many respects and differ so much from others that they may be segregated in a peculiar superfamily, the *Cottoidea*.

(3) The difference between *Hemitripterus* and the other *Cottoidea* warrant the isolation of the genus in a peculiar family, the *Hemitripteridæ*.

The detailed description of the family and the accompanying illustrations will furnish the data for judgment by others.

HEMITRIPTERIDÆ.

Synonyms as family name.

- =*Hemitripteridæ* Gill, Arrangement Family of Fishes, p. 6, 1872 (not defined).
- =*Hemitripteridæ* Gill, Johnson's New Univ. Cycl., vol. 2, p. 873, 1876 (defined).
- =*Hemitripteridæ* Gill, Standard Nat. Hist., vol. 3, p. 254, 1885 (named only).
- Triplidæ* gen., Bonaparte.
- Cottoidei* gen., Bleeker (1659).
- Scorpenidæ* gen., Günther.
- Cottidæ* sub-fam., Jordan and Gilbert.

Synonyms as subfamily names.

Hemitripterinæ Gill, *Canad. Nat.*, N. S., vol. 2, p. 251 (defined). 1865.

Hemitripterinæ Jordan and Gilbert, *Syn. Fishes N. Am.*, p. 683, 1882.

DIAGNOSIS.

Cottoidea, with a dorsal consisting of a very elongate acanthopterous and short arthropterous portion, incomplete subjugular or thoracic ventrals (I, 3), inflated head with depressed crown and prominent orbits, branchial apertures confluent, but with the branchiostegal membrane broad and continuous below, with the trunk antrorsiform, the vertebræ numerous (*e. g.* 16+23), and the myodome contracted behind and otherwise peculiarly developed.

DESCRIPTION.

Body elongate and antrorsiform or slightly dosadiform, and with the anus in the anterior half of the length.

Scales replaced by spiniform or prickly dermal appendages.

Lateral line decurved from the scapular region and submedian behind.

Head moderate or small, with turgid cheeks.

Eyes mostly or entirely in the anterior half of the head.

Nostrils double, separated by a narrow bridge, nearly midway between the snout and eyes.

Mouth terminal, with the cleft little oblique or almost horizontal.

Jaws normally developed; intermaxillines with short ascending processes; supramaxillines with wide inferior margins and with the terminal portions deflected.

Teeth acute, in broad bands on the jaws and palate.

Lips thin, obsolete in front.

Tongue well developed and free all around.

Suborbitals well developed; anterior extending forwards; third crossing the cheek nearly horizontally and articulating with most of the upper half of the preoperculum.

Opercular apparatus peculiar; *operculum* moderate, inclined upwards; *suboperculum* reduced, under the operculum and produced behind it in a linguiform lobe; *interoperculum* contracted under the preoperculum, leaving a part of the branchiostegal membrane exposed.

Branchiotremes continuous below.

Branchiostegals six; two arising from the inner side of the ceratohyal and four from the outer edge of the ceratohyal and epihyal.

Dorsalis developed into two parts, a long anterior composed of slender spines and a short posterior of articulated rays; the spinous dorsal typically has a sigmoid emargination, the first spine being longest, the two succeeding gradually decreasing, and the fourth to sixth shorter than the preceding or succeeding.

Anal elongate and without spines.

Pectorales moderate, with extended procurrent bases, and with all the rays connected by membrane, the lower at least being unbranched.

Ventrals thoracic, imperfect, being composed each of a spine and three unbranched rays.

Branchiæ four, with the slit behind the last arch obsolete.

Gill rakers short, developed as two rows of dentigerous plates on three arches and one (anterior) row on the fourth.

Branchial skeleton normal (cottoidean); three *basibranchials* ossified; *hypobranchials* of three pairs in line with the *ceratobranchials* of fourth arch suppressed; *ceratobranchials* and *epibranchials* of four arches well developed; *pharyngobranchials* reduced to one pair of basin-shaped dentigerous epipharyngeals convex on the dentigerous surface and excavated in the opposite, connected with all the epibranchials; *hypopharyngeals* divergent and each with a submarginal inferior keel.

REMARKS.

Externally the Hemitriptterids are distinguishable by a peculiar physiognomy and especially by the proportions of the dorsal fin. But the chief differences which are manifested on comparison with other forms are revealed by an examination of the cranium. The principal peculiarity lies in the mode in which the floor of the cranial cavity is modified. The myodome is much contracted behind by the depression and appression of the ledge of the basioccipitine to the body of the bone and the parasphenoid and its upheaval only towards its anterior margin; the ledge from the walls of the periotics are tilted very obliquely upwards and connected with each other and the ledge of the basioccipital by broad bands of cartilage; the basioccipital is also peculiar in being surmounted in front of the exoccipitines by partitions nearly parallel but incurved about the middle and sloping outwards, these being connected by cross bars inclosing recesses, one bar being formed by an uptilted shelf of the exoccipital and an anterior one by a thin oblique uplified shelf; the lateral walls project much beyond these and terminate in trenchant edges.* A character of less importance but still noteworthy is the atrophy or suppression of the median occipital crest, which, in the *Cottidae*, is well developed on the posterior wall of the cranium. These differences seem to be supplemented by others of minor importance but whose systematic significance can only be determined when more is known of the osteological details of the numerous genera of *Cottidae*.

The scapular arch is typically cottoidean, the upper three enlarged actinosts articulating directly with a cartilaginous extension of the

* The relations to the soft parts of these structures can only be determined by a careful study of the soft anatomy, for which I have not the material.

proscapula, while between the fourth and the proscapula intervenes the hypocoracoid; the hypercoracoid might well be mistaken for an actinost by one unacquainted with the morphology of the skeleton, as in fact it has been in the case of *Cyclopterus* by Dr. Günther.

Only one genus is known, viz:

HEMITRIPTERUS Cuvier, Règne An., 2. ed., vol. 2, p. 164, 1829.

Type *H. americanus*=*Scorpæna americana* Gmel.

PLATE XXXI.

Fig. 1. *Hemitripterus americanus* (reduced from Goode).

2. Cranium from side.

3. Cranium in medisection.

4. Cranium from above.

5. Cranium from below.

EXPLANATION OF LETTERS.

bo. Basioccipital.

eo. Exoccipital.

epo. Epiotic.

eth. Ethmoid.

fr. Frontal.

opo. Opisthotic.

par. Parietal.

pfr. Prefrontal.

pro. Prootic.

ps. Parasphenoid.

ptf. Postfrontal.

pto. Pterotic.

so. Supraoccipital.

v. Vomer.